

Features

Regulated Converters

- 2W power in SMD or DIP8 package
- 4:1 Input voltage range
- Efficiency up to 81%
- 1.6kVDC/1min isolation
- Regulated output
- -40°C to +85°C at full load
- Continuous short circuit protected

RECOM
DC/DC Converter

R2M

**2 Watt
DIP8 & SMD
Single & Dual
Output**



Description

The R2M is an isolated 2W DC/DC converter in a compact SMD package or DIP8 package available with 4:1 inputs covering 5, 12, 24, and 48V rails providing single or dual regulated, short-circuit protected outputs. There is no minimum load requirement. Isolation is 1.6kVDC/1min, and the operating temperature is from -40°C up to +85°C without derating. Class A and Class B EMC conformity requires only a few external components. Standard packaging is tube.

Selection Guide

Part Number	Input Voltage Range ⁽¹⁾ [VDC]	nom. Output Voltage [VDC]	Output Current [mA]	Efficiency typ. ⁽²⁾ [%]	max. Capacitive Load ⁽³⁾ [μF]
R2M-xx3.3S	4.5-18, 9-36, 18-75	3.3	500	77-78	2200
R2M-xx05S	4.5-18, 9-36, 18-75	5	400	78-79	1000
R2M-xx09S	4.5-18, 9-36, 18-75	9	222	79	660
R2M-xx12S	4.5-18, 9-36, 18-75	12	167	81	550
R2M-xx15S	4.5-18, 9-36, 18-75	15	134	81	440
R2M-xx24S	4.5-18, 9-36, 18-75	24	83	80	200
R2M-xx05D	4.5-18, 9-36, 18-75	±5	±200	77	±660
R2M-xx12D	4.5-18, 9-36, 18-75	±12	±83	80	±330
R2M-xx15D	4.5-18, 9-36, 18-75	±15	±67	81	±200

Notes:

Note1: Refer to "Input Voltage Range"

Note2: Efficiency is tested at nominal input and full load at +25°C ambient

Note3: Max Cap Load is tested at nominal input and full resistive load

Model Numbering



Notes:

Note4: add suffix "/SMD" for SMD version, or leave blank for DIP8 THT version.

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS						
Parameter		Condition		Min.	Typ.	Max.
Input Voltage Range		nom. V _{IN} = 12VDC		4.5VDC	12VDC	18VDC
		nom. V _{IN} = 24VDC		9VDC	24VDC	36VDC
		nom. V _{IN} = 48VDC		18VDC	48VDC	75VDC
Input Surge Voltage		1 second max.	nom. V _{IN} = 12VDC			25VDC
			nom. V _{IN} = 24VDC			50VDC
			nom. V _{IN} = 48VDC			100VDC
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Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS

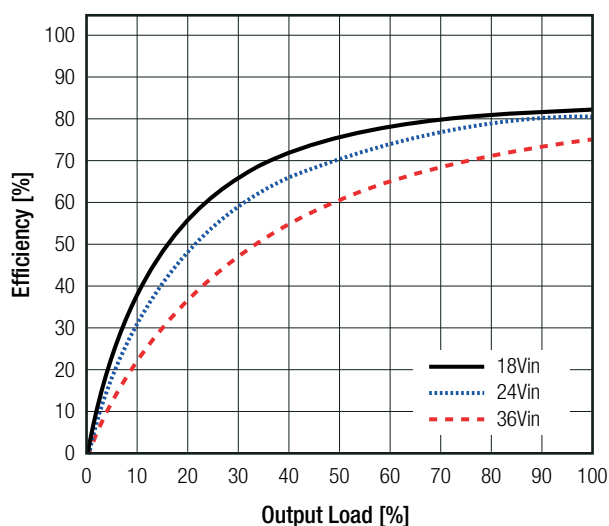
Parameter	Condition	Min.	Typ.	Max.
Quiescent Current	nom. $V_{IN} = 12\text{VDC}$		40mA	
	nom. $V_{IN} = 24\text{VDC}$		20mA	
	nom. $V_{IN} = 48\text{VDC}$		15mA	
Start-up time	power up, CTRL ON/OFF		10ms	20ms
ON/OFF CTRL ⁽⁵⁾	DC-DC ON	open or high impedance		
	DC-DC OFF	2mA	3mA	4mA
Standby Current	DC-DC OFF		2.5mA	
Internal Operating Frequency		100kHz		
Output Ripple and Noise	20MHz BW		50mVp-p	
Reflected Back Ripple Current	with external components	nom. $V_{IN} = 12\text{VDC}$	30mA _{p-p}	
		nom. $V_{IN} = 24\text{VDC}$	30mA _{p-p}	
		nom. $V_{IN} = 48\text{VDC}$	20mA _{p-p}	

Notes:

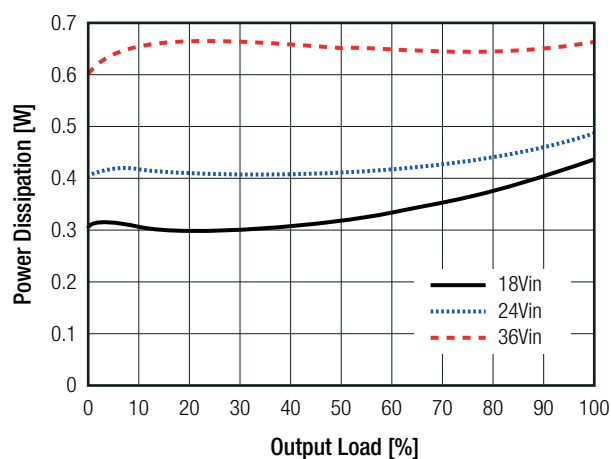
Note5: Refer to "ON/OFF CTRL"

R2M-2405S/SMD

Efficiency vs. Load

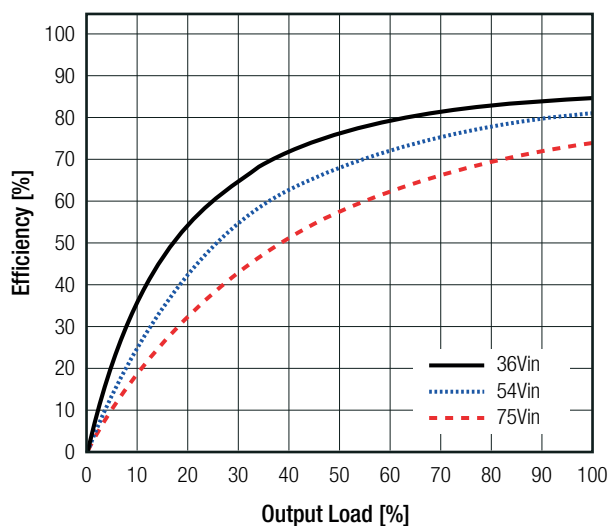


Power Dissipation vs. Load

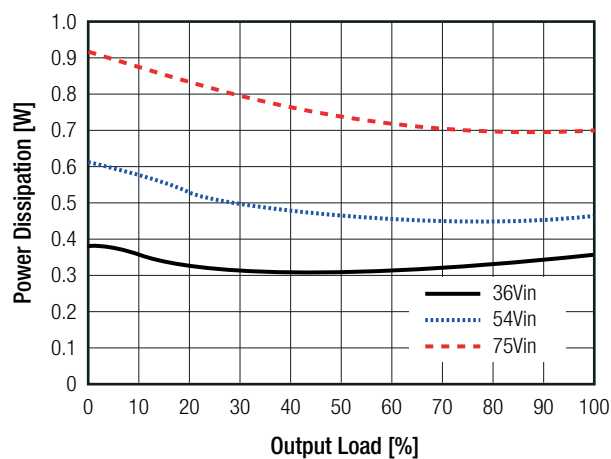


R2M-4812S/SMD

Efficiency vs. Load



Power Dissipation vs. Load

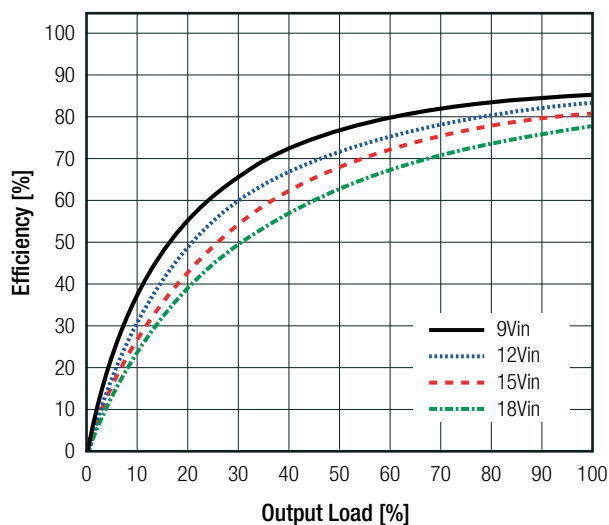


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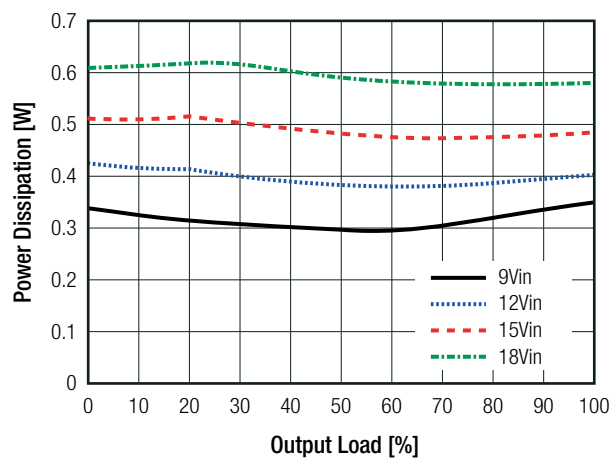
Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

R2M-1212S/THT

Efficiency vs. Load

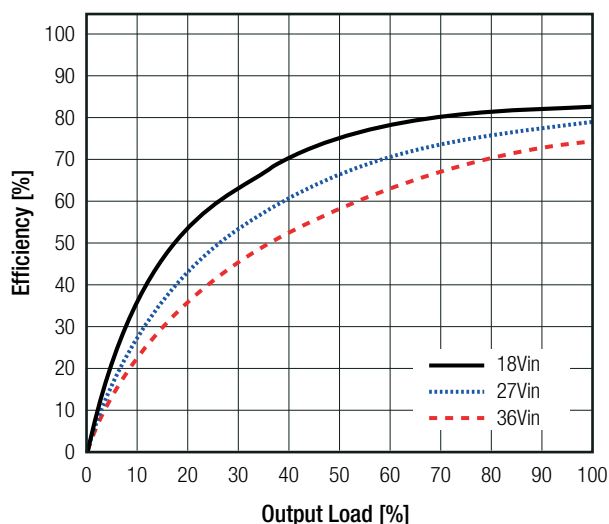


Power Dissipation vs. Load

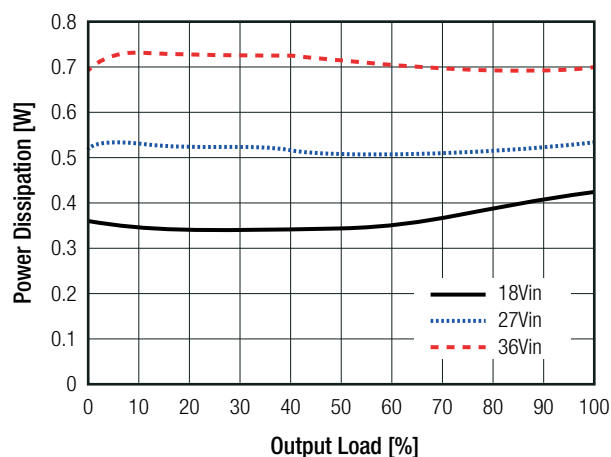


R2M-2405D/THT

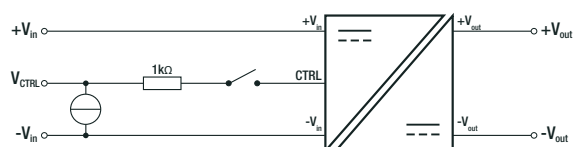
Efficiency vs. Load



Power Dissipation vs. Load



ON/OFF CTRL



DC-DC ON	Open or high impedance
DC-DC OFF	2.0mA to 4.0mA max.

Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

REGULATIONS

Parameter	Condition		Value
Output Accuracy			±1.0% max.
Line Regulation	low line to high line, full load		±0.2% max.
Load Regulation	0% to 100% load	single	1% max.
		dual	1% max.
	10% to 90% load	single	0.5% max.
		dual	0.8% max.
Cross Regulation	asymmetrical 25% / 100% load		±5% max.
Transient Response Recovery Time	25% load step change		±250µs typ.

PROTECTIONS

Parameter	Type		Value
Short Circuit Protection (SCP)			continuous, auto recovery
Isolation Voltage ⁽⁶⁾	I/P to O/P	1 minute	1.6kVDC min.
Isolation Resistance	I/P to O/P, V _{ISO} = 500VDC		1GΩ min.
Isolation Capacitance	I/P to O/P, 100kHz/0.1V		50pF typ.

Notes:

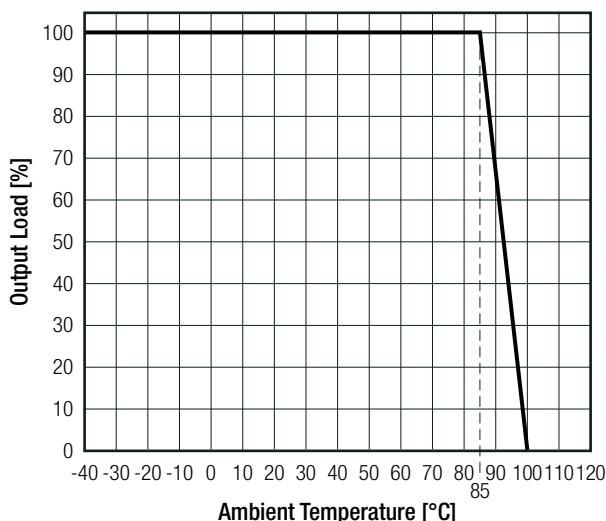
Note6: This power module is not internally fused. An input line fuse must always be used
Recom suggests: 12Vin=T1A; 24Vin=T0.5A; 48Vin=T0.315A slow blow

ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	with derating		-40°C to +105°C
	without derating		-40°C to +85°C
Maximum Case Temperature	measured at "tc point"		+105°C
Operating Humidity	non-condensing		5% - 95% RH max.
Thermal Shock			according to MIL-STD-810F
Vibration			according to MIL-STD-810F
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	6670 x 10 ³ hours

Derating Graph

(@ Chamber and natural convection 0.1m/s)

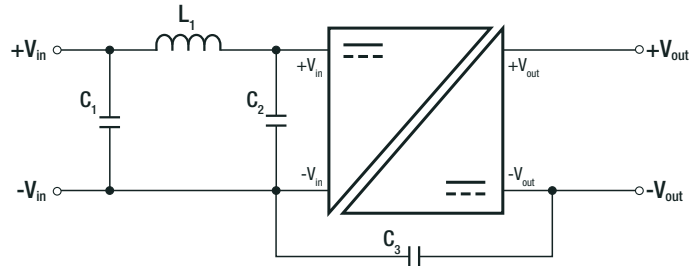


Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	File Number	Standard
RoHS2		RoHS-2011/65/EU + AM-2015/863
EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment – Emission Requirements	with external filter refer to “ EMC Filtering ”	EN55032, Class A and B

EMC Filtering Suggestions according to EN55032



Class A Component List

Model	C1	C2	C3	L1
R2M-12xxS	22 μF	N/A	220pF	6.8 μH
R2M-24xxS	10 μF	N/A	470pF	15 μH
R2M-48xxS	2.2 μF	N/A	680pF	68 μH

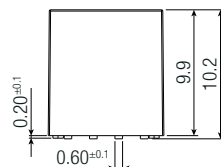
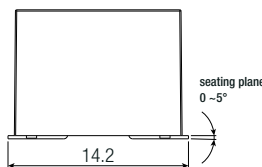
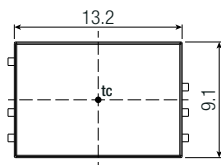
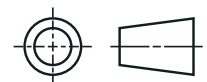
Class B Component List

Model	C1, C2	C3	L1
R2M-12xxS	22 μF	220pF	6.8 μH
R2M-24xxS	10 μF	470pF	15 μH
R2M-48xxS	2.2 μF	680pF	68 μH

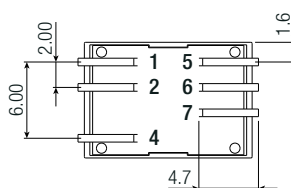
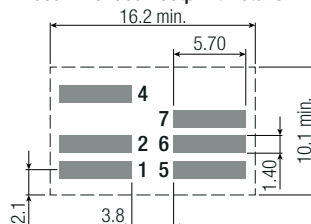
DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	baseplate/case	black plastic (UL94 V-0)
	potting	silicone (UL94 V-0)
Dimension (LxWxH)		14.2 x 9.1 x 10.2mm
Weight		2.7g typ.

Dimension Drawing standard “/SMD” version (mm)



Recommended Footprint Details



Pinning Information

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
4	CTRL	CTRL
5	NC	-Vout
6	-Vout	COM
7	+Vout	+Vout

NC= no connection

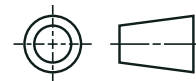
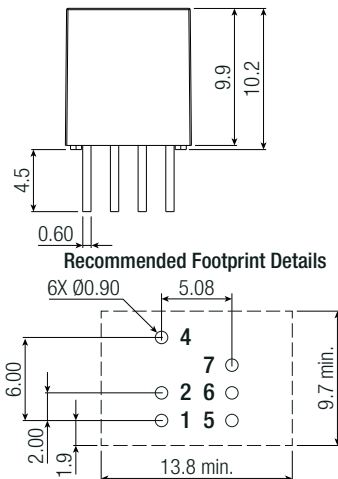
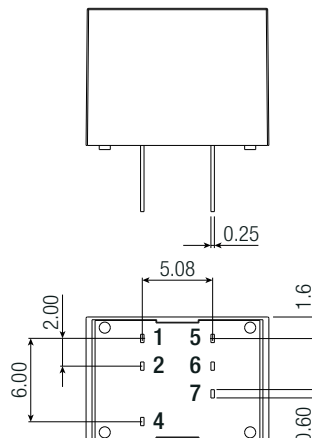
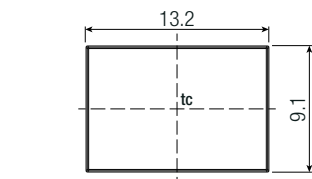
Tolerance:

xx.x = $\pm 0.5\text{mm}$
xx.xx = $\pm 0.25\text{mm}$

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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Dimension Drawing “/THT” version (mm)



Pinning Information

Pin #	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
4	CTRL	CTRL
5	NC	-Vout
6	-Vout	COM
7	+Vout	+Vout

NC= no connection

Tolerance:
xx.x = ±0.5mm
xx.xx = ±0.25mm

PACKAGING INFORMATION

Parameter	Type		Value
Packaging Dimension (LxWxH)	tube		218.0 x 17.2 x 19.9mm
Packaging Quantity			20pcs
Storage Temperature Range	non-condensing		-55°C to +125°C
Storage Humidity			5% to 95% RH max.
Moisture Sensitive Level	MSL peak temp. ⁽⁷⁾	THT	Level 1
		SMD	Level 2

Notes:

Note7: The Moisture Sensitivity Level rating is according to the JEDEC industry standard classifications and peak solder temperature